What is claimed is:

1. An evaporator for evaporating materials for use in a coating process comprising:

a heating crucible for containing a coating material to be evaporated;

a generally planar heat source disposed so as to heat a surface of the coating material in the heating crucible, the heat source including a first layer defining a first set of openings for the evaporated material to pass through and a second layer defining a second set of openings for the evaporated material to pass through, the first layer spaced apart from the second layer.

2. The evaporator of claim 1 wherein the heat source comprises a ceramic material.

3. The evaporator of claim 1 wherein the heat source comprises an intermetallic material.

4. The evaporator of claim 1 wherein the heat source comprises a material selected from the group consisting of graphite, aluminum oxide, aluminum nitride, boron nitride and titanium diboride.

5. The evaporator of claim 1 wherein the heat source is disposed above the heating crucible.

6. The evaporator of claim 1 wherein the heating crucible further comprises a movable sidewall wherein the sidewall is movable during an evaporation process for varying the capacity of the heating crucible and maintaining a constant distance between the surface of the coating material being evaporated and the heat source.

7. The evaporator of claim 6 further comprising a driver coupled to the movable sidewall for moving the movable sidewall.

8. The evaporator of claim 7 further comprising a controller for controlling an evaporation process wherein the driver for controlling the movement of the movable sidewall is coupled to and controlled by the controller.

9. The evaporator of claim 1 further comprising a power supply coupled to the heat source and providing an electrical current therethrough for heating the heat source.

10. The evaporator of claim 1 wherein the first and second layers of the heat source comprise electrical heaters, a first power supply is coupled to the first layer of the heat source and provides an electrical current therethrough for heating the first layer, a second power supply is coupled to the second layer of the heat source and provides an electrical current therethrough for heating the second layer, wherein the first and second power supplies provide independent control of the temperatures of the first and second layers of the heat source respectively.

11. The evaporator of claim 1 wherein the first and second layers of the heat source are positioned in an overlying relationship and the first set of openings are not aligned with the second set of openings for causing deflection of heated and vaporized coating material passing through the heat source for facilitating complete evaporation thereof.

12. The evaporator of claim 1 further comprising a baffle plate disposed between the first layer and the second layer of the heat source, the baffle plate defining openings therein, the openings in the baffle plate being out of alignment with at least one of the first set of openings and the second set of openings for deflecting coating material passing therethrough.

13. The evaporator of claim 1 wherein at least a portion of the first set of openings and the second set of openings are circular.

14. The evaporator of claim 1 wherein at least a portion of the first set of openings and the second set of openings are slots.

15. The evaporator of claim 1 further comprising an auxiliary crucible connected in fluid communication with the heating crucible for containing a supply of a coating material and maintaining a constant volume of a coating material in the heating crucible.

16. The evaporator of claim 15 further comprising transfer means in fluid communication with the heating crucible and the auxiliary crucible for transferring

coating material therebetween.

17. The evaporator of claim 1 further comprising a high vacuum chamber wherein the heating crucible and the heat source are disposed in the high vacuum chamber.

18. A system for coating a substrate by evaporating a coating material in a vacuum chamber, the system comprising:

a heating crucible for containing a coating material to be evaporated;

a generally planar heat source disposed so as to heat a surface of a coating material contained in the heating crucible, the heat source including a first layer defining a first set of openings and a second layer defining a second set of openings, the second layer overlying the first layer and spaced apart therefrom, the first and second sets of openings for evaporated coating material to pass therethrough;

at least one containment shield disposed above the heat source, the containment shield defining a deposition zone for confinement of the vaporized coating material therein;

a process roll for supporting a substrate to be coated in the deposition zone,

a vacuum chamber wherein the heating crucible, the heat source and the deposition zone are disposed therein for evaporation of the coating material in a vacuum.

19. The system of claim 18 wherein the heat source comprises a ceramic material.

20. The system of claim 18 wherein the heat source comprises an intermetallic

material.

21. The system of claim 18 wherein the heat source comprises a material selected from the group consisting of graphite, aluminum oxide, aluminum nitride, boron nitride and titanium diboride.

22. The system of claim 18 wherein the heat source is disposed above the heating crucible.

23. The system of claim 18 further comprising a shutter mechanism removably positionable between the heat source and a substrate to be coated.

24. The system of claim 18 further comprising a plasma generator in communication with the deposition zone for providing a reactive plasma for use in a coating process.

25. The system of claim 18 wherein the heating crucible further comprises a movable sidewall wherein the sidewall is movable during an evaporation process for varying the capacity of the heating crucible and maintaining a constant distance between the surface of the coating material being evaporated and the heat source.

26. The system of claim 25 further comprising a driver coupled to the movable sidewall for moving the movable sidewall thereby varying the capacity of the heating crucible.

27. The system of claim 26 further comprising a controller for controlling an evaporation process wherein the driver for controlling the movement of the movable sidewall is coupled to and controlled by the controller.

28. The system of claim 26 wherein the driver includes a variable length cylinder.

29. The system of claim 18 further comprising a power supply coupled to the heat source and providing an electrical current therethrough for heating the heat source.

30. The system of claim 18 further wherein the first and second layers of the heat source comprise electrical heaters, a first power supply is coupled to the first layer of the heat source and provides an electrical current therethrough for heating the first layer, a second power supply is coupled to the second layer of the heat source and provides an electrical current therethrough for heating the second layer, wherein the first and second power supplies provide independent control of the temperatures of the first and second layers of the heat source respectively.

31. The system of claim 18 wherein the first set and second layers of the heat source are positioned in an overlying relationship and the first set of openings are not aligned with the second set of openings for causing deflection of heated and vaporized coating material passing through the heat source and facilitating complete evaporation of the coating material.

32. The system of claim 18 further comprising a baffle plate disposed between the first layer and the second layer of the heat source, the baffle plate defining openings

therein, the openings in the baffle plate being out of alignment with at least one of the first set of openings and the second set of openings for deflecting coating material passing therethrough.

33. The system of claim 18 further comprising an auxiliary crucible in fluid communication with the heating crucible for maintaining a constant volume of coating material in the heating crucible.

34. The system of claim 33 further comprising transfer means in fluid communication with the heating crucible and the auxiliary crucible for transferring coating material therebetween.

35. The system of claim 18 wherein a distance between the heat source and a substrate to be coated is variable.

36. The system of claim 18 further comprising a substrate driver coupled to the process roll for driving the process roll and moving a substrate through the deposition zone.

37. The system of claim 18 further comprising at least one of a feeder roll and a take-up roll disposed parallel to the process roll and coupled thereto for feeding a continuous substrate through the deposition zone.

38. The system of claim 18 further wherein the process roll comprises a drum for

supporting a substrate including discrete articles to be coated.

39. The system of claim 18 wherein the process roll comprises multiple substrate fixtures for supporting discrete articles to be coated.

40. The system of claim 18 wherein the process roll includes a delivery system for transporting a substrate including a plate to be coated.

41. The system of claim 18 further comprising a controller coupled to at least one component of the system for controlling an evaporation process.

42. A generally planar heat source for use in evaporating a coating material, the heat source comprising a ceramic or intermetallic material having a constant electrical resistance, and defining a set of openings therein for a vaporized coating material to pass therethrough, the heat source having opposing ends connectable to a power supply for supplying electrical power through the heat source for heating the heat source.

43. The heat source of claim 42 further comprising a material selected from a group consisting of graphite, aluminum oxide, aluminum nitride, boron nitride and titanium diboride.

44. The heat source of claim 42 wherein the heat source includes a first layer defining a first set of openings and a second layer defining a second set of openings, the first

layer spaced apart from the second layer.

45. The heat source of claim 44 wherein the first set of openings and the second set of openings are out of alignment with respect to each other.

46. The heat source of claim 44 wherein the first layer of the heat source is formed integral with the second layer.

47. A method of evaporating a coating material for coating a substrate in a high vacuum environment, the method comprising the steps of:

depositing a quantity of coating material to be evaporated in a heating crucible;

placing a heat source above a surface of the coating material in the crucible for vaporizing the coating material at the surface;

heating the surface of the quantity of coating material to a predetermined temperature for evaporating the coating material at the surface;

confining the vaporized coating material in a deposition zone;

moving a substrate through the deposition zone for coating the substrate with the evaporated coating material from the crucible; and

enveloping the heating crucible, the heat source and the deposition zone in a vacuum chamber for evaporating and depositing the coating material on a substrate in a vacuum.

48. The method of claim 47 including a step of maintaining an approximately constant distance between a surface of a heat source and the surface of the coating

material in the crucible during the step of heating for consistency in the evaporation thereof.

49. The method of claim 48 wherein the step of maintaining an approximately constant distance between the heat source and the surface of the coating material includes a step of reducing the capacity of the heating crucible according to a rate of depletion of the quantity of coating material in the heating crucible.

50. The method of claim 48 wherein the step of maintaining an approximately constant distance between the heat source and the surface of the coating material includes a step of replenishing the quantity of coating material in the crucible according to a rate of depletion thereof.

51. The method of claim 47 wherein the step of heating includes a step of heating first and second layers of a heat source.

52. The method of claim 51 further comprising a step of heating the first layer of the heat source independently from the second layer.

53. The method of claim 47 further comprising a step of providing openings in the heat source for the evaporated coating material to pass therethrough.

54. The method of claim 47 wherein the step of heating further comprises a step of deflecting the path of the vaporized coating material between first and second layers of

a heat source for facilitating complete evaporation of the coating material passing through the heat source.

55. The method of claim 47 wherein the step of heating includes providing a heat source comprising a material selected from the group consisting of graphite, aluminum oxide, aluminum nitride, boron nitride and titanium diboride.

56. The method of claim 47 further comprising monitoring the coating of a substrate including at least one of monitoring a feed rate of the substrate through the deposition zone, monitoring the temperature of a surface of the heat source, monitoring the temperature of the deposition zone, monitoring the temperature of the coating material in the crucible and monitoring the thickness of the coating on the substrate.

57. The method of claim 56 further comprising adjusting at least one of the temperature of the heat source and the feed rate of the substrate through the deposition zone.